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EXAMINER	
PHAM, THOMAS K	

ART UNIT	PAPER NUMBER
2121	

DATE MAILED: 01/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/759,962	GIDWANI, JAWAHAR M.	
	Examiner	Art Unit	
	Thomas K Pham	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *05 November 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Amendment

1. This action is in response to request for re-consideration filed on 11/05/2004.

2. Claims 1-22 have been considered but they are not persuasive.

3. Applicant's amendment, with respect to the new issue of claims 1 and 16, necessitated the new ground(s) of rejection presented in this Office action.

Quotations of U.S. Code Title 35

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim Rejections - 35 USC § 102

6. Claims 1 and 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,388,056 ("Horiuchi") in view of.

Regarding claim 1

Horiuchi teaches a computer-implemented method for analyzing a structure comprising:

- receiving linear elastic input data of a structure without requiring a physical presence of the structure (fig. 22 and col. 13 line 64 to col. 14 line 8, "FIG. 22 shows ... as the analog signal" [this embodiment shows that it is possible to analyze the data without the presence of element 78 which includes a structure]);
- automatically determining non-linear input data based on the received linear elastic input data (col. 6 lines 61-68, "The digital computer 5 ... to as "numerical model")");
- analyzing the determined non-linear input data through a non-linear analysis technique (col. 7 line 3 to col. 9 line 31, "Among the object structure 1 ... the velocity and acceleration") ; and
- outputting the result of analysis (col. 13 lines 51-55, "FIG. 21 shows ... via the D/A converter 6").

Regarding claim 5

Horiuchi teaches analyzing includes using a minimization technique to minimize the storage requirements of a global stiffness matrix and local stiffness matrix (col. 7 lines 16-17, "K: a stiffness matrix of the numerical model 10").

Regarding claim 6

Horiuchi teaches analyzing includes using a numerical solution technique that requires only one copy of a global stiffness matrix (col. 7 lines 17-22, "f: an external force ... differentiated value in time").

Regarding claim 7

Horiuchi teaches reformulating and reducing only a portion of a global stiffness matrix that changes due to change in member state or large displacement effects (col. 10 lines 25-34, "FIG. 7 shows a typical ... is determined").

Regarding claim 8

Horiuchi teaches analyzing includes using a sufficiently higher order integration method to increase the step size thereby reducing the number of steps required for analysis (col. 8 lines 9-14, "In order to execute ... this accurate measurement").

Regarding claim 9

Horiuchi teaches analyzing includes: using a minimization technique to minimize the storage requirements of a global stiffness matrix and local stiffness matrix (col. 7 lines 16-17, "K: a stiffness matrix of the numerical model 10"); using a numerical solution technique that requires only one copy of the global stiffness matrix (col. 7 lines 17-22, "f: an external force ... differentiated value in time"); reformulating and reducing only a portion of a global stiffness matrix that changes due to change in member state (col. 10 lines 25-34, "FIG. 7 shows a typical ... is determined"); and using a sufficiently higher order integration method to increase the step size thereby reducing the number of steps required for analysis (col. 8 lines 9-14, "In order to execute ... this accurate measurement").

7. Claim 16 is rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,842,148 ("Prendergast").

Regarding claim 16

Prendergast teaches a computer-implemented method for analyzing a structure comprising:

- classifying a plurality of structures according to predetermined structure types (col. 2 lines 4-8, "a method for ... earthquake or wind forces") without requiring a physical presence of the structure (col. 5 lines 25-35, "After the structure is inspected ... geologic data 33 and wind data 36, respectively" [the input data is collected manually by engineers so there is no need for the physical presence of the damage structure during evaluation of the software engine.]),
- sub-classifying the structures within each classified structure type by fundamental structure periods (col. 2 lines 4-8, "a method for ... earthquake or wind forces");
- determining damage functions for the sub-classified structures (col. 6 lines 59-65, "After the analysis ... for any given rating"); and
- storing the determined damage functions (col. 2 lines 29-34, "This data is input ... the structure is located").

Claim Rejections - 35 USC § 103

8. Claims 2-4, 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horiuchi in view of U.S. Patent No. 6,412,237 ("Sahai").

Regarding claim 2

Horiuchi teaches a computer-implemented method for analyzing a structure but does not teach determining a static load pushover profile for use in a static load pushover analysis. However, Sahai teaches determining a static load pushover profile for use in a static load pushover analysis (col. 10 col. 1-10, "Specific analyses include ... of the earthquake criteria"). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention to incorporate the

Static Pushover analysis of Sahai with the computer method of Horiuchi because it would provide for clearly depicting step by step the behavior of the inelastic response of the frame.

Regarding claim 3

Horiuchi teaches automatically determining non-linear input data but does not include automatically determining the envelope behavior, degradation behavior, and failure behavior of members of the structure based on previously determined models of the members and the received linear elastic input data. However, Sahai teaches using standard commercial software programs for automatically determining the deflections, stresses, elastic behavior in the structural frame based on previous models (col. 9 line 63 to col. 10 line 10). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention to incorporate the automatic computer analysis of Sahai with the computer method of Horiuchi because it would provide for clearly depicting step by step the behavior of the inelastic response of the frame.

Regarding claim 4

Horiuchi teaches at least a part of the data for the previously determined models is based on experimental or empirical data, and each model is stored as a plurality of data points, a mathematical representation, or both (col. 4 lines 21-31, "Effective evaluation of the results ... after completion of the test").

Regarding claim 10

Sahai teaches displaying a summary of inelastic sequence of events for damaged members of the structure (col. 13 lines 51-55, "FIG. 21 shows ... via the D/A converter 6").

Regarding claim 11

Sahai teaches the summary includes global, regional, and local damage measures (table 1).

Regarding claim 12

Sahai teaches the global damage measure includes global displacement ductility and number of damaged members, the regional damage measure includes one or more of inter-story drifts, inter-story shears, number of damaged members in the region, and identification of damaged members, and the local damage measure includes maximum member ductilties, cumulative member ductlities and number of cycle reversals (col. 11 lines 6-30, "While the frame is ... other 3% damping").

Regarding claim 13

Horiuchi and Sahai do not teach outputting includes outputting a color-coded image of the structure showing different levels of damage to the members of the structure. However, it would have been obvious to one of ordinary skill in the art at the time the invention that color-coding them identifies different levels of damages much easier, as it is known in the art of blue print and building design.

9. Claims 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prendergast in view of Sahai.

Regarding claim 17

Sahai teaches determining non-structural damage functions corresponding to the structural damage functions (col. 11 lines 25-30, "Generally this is ... the other 3% damping").

Regarding claim 18

Sahai teaches classifying the plurality of structures according to either FEMA guidelines or building code guidelines (col. 11 lines 15-17, "for the structure ... document FEMA-273").

Regarding claim 19

Prendergast teaches sub-classifying as similar structures all structures within a classified structure type whose fundamental structure period falls within a predetermined range (col. 3 lines 57-62, "The structural characteristics ... associated with damage").

Regarding claim 20

Prendergast teaches receiving location and other data of a first structure, identifying among the plurality of classified structures one classified structure that corresponds to the first structure, and retrieving the stored damage function of a sub-classified structure that corresponds to the identified structure for analysis of the first structure (col. 6 lines 16-56, "Wood frame, one to ... and/or wind database 36").

Regarding claim 21

Prendergast teaches determining a fault that likely causes damage to the first structure, determining at least one spectral acceleration of the determined fault line to the structure, and determining a damage measure for the determined spectral acceleration from the retrieved damage function (col. 5 line 62 to col. 6 line 16, "It is generally accepted ... when evaluating risk").

Regarding claim 22

Prendergast teaches determining damage functions of a plurality of previous disasters; and calculating a mean damage function from the determined damage functions by regression (col. 6 lines 25-28, "Damage to a specific ... in the past").

10. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horiuchi in view of U.S. Patent No. 5,842,148 ("Prendergast").

Regarding claim 14

Horiuchi teaches a computer-implemented method for analyzing a structure but does not teach repeating the analyzing step for each of a plurality of intensities or probabilities of a preselected catastrophic load; and displaying the number of damage measures as a function of the intensities or probabilities of the preselected catastrophic load. However, Prendergast teaches a probabilistic program is used to evaluate a number of parameters in determining the relative risk of damage to the structure (col. 5 lines 47-60, "USQUAKE, and similar ... for a wind related analysis"). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention to incorporate the probabilistic analysis of Prendergast with the computer method of Horiuchi because it would provide for estimating the damages caused to the structure and how similar structures performed in the past.

Regarding claim 15

Prendergast teaches using the damage measures to assess monetary losses or to make a financial or mitigation decision (col. 6 line 66 to col. 7 line 2, "The rating and report ... lower insurance rates").

Response to Arguments

In the remark the applicant argues that cited reference fails to disclose:

I) "without requiring a physical presence of the structure" as to claims 1 and 16.

In response to applicant's argument,

I) Prior art Horiuch (5,388,056) teaches column 13 line 64 to col. 14 line 8 as follow:

> " FIG. 22 shows a still further embodiment of the present invention. The shown embodiment is directed to a vibration response analyzing system which comprises the digital computer 5, a digital input device 73, an external memory 76 and an output device 75. In the digital computer 5, a calculation condition input routine 70, a vibration response calculating routine 71 and a calculation result processing routine 72 are installed. Also, the system includes an internal memory 77 to be used for vibration analysis or so forth. The digital input device 74 can be replaced by an analog input device 74 for inputting the excitation force or so forth as the analog signal."

This embodiment shows that it is possible to analyze the data which collect input from a digital input device 13 and output to device 75 without a need of a physical presence of a structure (which included in element 78 of figure 22).

Prior art Prendergast (5,842,148) teaches column 5 lines 25-35 as follow:

> " After the structure is inspected, and the structural characteristics data 20 is collected, this information is input to a risk evaluation program at step 30 for analysis. In a preferred embodiment, the information is digitized and entered into a GIS (Geographic Information Systems) database containing a probabilistic program that has been specifically designed to evaluate and determine the relative risk of a given structure, specific to its location and other factors, when subjected to shaking and stresses of earthquake shaking or wind forces, as indicated by databases for geologic data 33 and wind data 36 respectively.

The structural characteristic data is collected manually by engineers and inputted to an evaluation program. Thus, there is no need for the physical presence of the damage structure during evaluation of the software engine. Therefore, both Horiuch and Prendergast meet the limitations of the claims.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner *Thomas Pham*; whose telephone number is (571) 272-3689, Monday to Thursday from 6:30 AM - 5:00 PM EST or contact Supervisor *Mr. Anthony Knight* at (571) 272-3687.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas Pham
Patent Examiner

TP

January 14, 2005

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